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## EFFICIENCY IN WATER REVENUE COLLECTION

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The attainment of efficiency in any undertaking is, to a great extent, dependent upon a careful study of local conditions and the assimilation of a vast amount of detail which has to be co-ordinated along certain definite functional lines. This is especially true when applied to the water department of a municipality; and, when it is further realized that furnishing a supply of water provides by far the largest source of revenue in most cities, the application of these fundamental principles deserves more attention than is ordinarily given to this important matter.

As a factor of efficiency in water revenue collection, inspection undoubtedly takes first place. No system of accounting control can possibly offset inspection work inefficiently performed. The first essential, therefore, would be to obtain capable and conscientious inspectors. The next step would be to divide the city into districts, each district being just large enough for one man to cover. The inspectors should be shifted from district to district as often as possible, especially in the larger cities where it is more difficult to keep in close touch with the men in the field and their work. Protracted service in the same district permits an inspector to get too well acquainted with the consumers with whom he may come in contact. It would be advisable to have a corps of supervisors in the field to oversee the work of the inspectors.

Requests for inspection would be made on the inspection division in card form, the card later forming a permanent record of premises inspected. The information on these cards would be spread upon the inspectors' report blanks, and would contain data covering the various purposes of inspection, for instance, complete examinations, building purposes, taps and services, demolitions, metered premises or unmetered premises. These reports would be of various colors, according to the nature of the inspection required, and would contain a series of questions to be answered by the in-

spector. A record should be kept in each division of the requests made for inspections, and a form of receipt retained by the inspection division upon rendering the requested reports to the originating division.

A route sheet, filled in by each inspector, showing the order in which he proposes to examine the various premises, would be left with the chief inspector before the former leaves headquarters each morning. The inspectors would be required to report their work on a daily summary sheet, showing the time of arrival at the first and of departure from the last premises visited during the day, as well as the street addresses and the order of inspection. These summary sheets would give a synopsis of work performed, including meter readings, examinations, inspections, special reports, et cetera, and would also show work assigned to an inspector which he failed to complete.

A supply of notices covering the more prevalent forms of violations and irregularities would be furnished to the inspector, who would serve them on owners and occupants as occasion demanded. They would be used in cases of the discovery of meters not accessible or in need of repair, leak and waste, hose violations and use of water without permission. It would be advisable also to provide special forms of meter dial charts to record the index where there is any doubt as to the registration. The inspector would likewise be supplied with special report blanks for use in connection with irregularities not covered by printed notices for specific violations. All notices should be printed on a standard size of form which would fit into a metal binder. The inspectors should submit a daily list of irregularities discovered for the correction of which notices had been served. Such procedure affords a complete system of control by the central office if appropriate follow-up notices are issued from these lists.

An efficiency record would be compiled from the synopsis of each inspector's work as shown on his daily summary sheet. The monthly totals of these record sheets would make a valuable comparative report of each inspector's work.

The inspection and accounting records are so interdependent that, without a proper accounting system, the inspection work, no matter how efficiently performed, must necessarily be greatly impaired. The information obtained in the field by the inspectors

must not only be accurately recorded but must also be controlled by the accounting records.

Before any entry is made in a consumer's ledger it should be placed in control. This control would be obtained by scheduling day by day the records of original entry, viz., the meter reading sheets, the reports on collections, the inspectors' reports on new or additional supplies, and the adjustments of rates. For this purpose various kinds of schedules would be used, including schedules of charges for unmetered services, of meter readings, of collections and of adjustments. The totals of the daily schedules would be recapitulated on summary sheets, the totals of which in turn would be entered in the respective revenue and adjustment journals or on a monthly recapitulation of collections. The analytical totals of these latter records would be posted monthly, through the general journal, to the appropriate accounts in the general ledger. The schedules would be compiled by listing all items so as to obtain the total debits or credits to be posted to each ledger. The ledger clerks would post individual items to consumers' ledger accounts, while the control clerk would enter the totals only on the control sheets of the respective ledgers.

A control card, on which the particulars of each unmetered supply and alterations thereto may be originally recorded, provides an effective check if the bills are made out from such cards instead of from the consumers' ledgers. The ledgers should be balanced monthly and agreed with the respective control sheets. A summary of the control sheets would be made each month so that a grand total of the consumers' ledger balances could be compared and agreed with the balances shown on the respective accounts in the general ledger.

From the time the main is tapped, inspection should be prompt and painstaking. By maintaining proper records covering the erection of new buildings, and the alterations to or demolition of old buildings, much waste of water will be prevented and revenue obtained which might be otherwise overlooked. Where the charge for water supplied for building purposes is based on the estimated quantity of materials to be used, such estimates should be carefully checked with the plans by a qualified person. An affidavit by the builder, owner or architect is not usually sufficient. Co-operation with the building department, where the detailed plans for new and

altered buildings are examined and filed, would appear to give the most satisfactory results. The building in any event should be surveyed on completion, as deviations from the original plans are frequent and a loss of revenue is likely to occur unless attention is paid to such matters.

Unquestionably the control over the collection of water revenue will be most efficient when the charge for water consumed can be based on the registration of the water meter. The use of a meter conserves the supply by controlling waste, and constitutes the only equitable basis of charge to the consumer. Many cities, however, do not own the meters and are consequently working under difficulties. The location of the meter is also of importance and has a very direct bearing upon efficiency in meter reading. The sealing of meters, too, is a matter requiring competent supervision if proper control over revenues is to be obtained.

All meters should be read and billed regularly and promptly, the larger meters receiving more frequent attention than the smaller ones. Careful study should be made of each inspector's work to insure the maximum number of readings. Loose leaf meter reading sheets in metal binders afford greater facilities in reading than any other method because of the ease with which they can be distributed or rearranged to meet altered conditions. It may be found expedient to code the various defects that may exist in a meter and thus save the writing of much detailed information. Meters out of order demand prompt repair if a loss of revenue due to comprising an "average" bill for a lengthy period, is to be avoided.

Rules and regulations covering the setting, disconnecting and repairing of meters should be established and strictly enforced. Such work should be controlled by the issue of permits to licensed plumbers, if not performed by the water department itself.

Accurate meter reading, while absolutely necessary, is not in itself the most vital feature connected with metered supplies. This was very clearly disclosed by tests conducted in New York City within the past two years when, of 20,000 meters examined, some were found to be registering only 15 per cent., and the average only about 75 per cent. of the water passing through them. The consequent loss of revenue assumes alarming proportions when one considers that New York City, where only one-fifth of the supplies are metered, collects approximately \$6,500,000 annually in meter rates.

It would therefore seem advisable that all meters should be tested at a properly equipped meter testing station, operated by the department. The insertion of test tees provides an easy method of making some of these tests on the premises without removing the meter. All meters require attention at intervals, and testing will usually be found a fruitful source of revenue far in excess of the cost of such work.

Existing laws and peculiar local conditions prevent many municipalities from adopting universal metering or from even acquiring physical possession of the meters. Various methods of charging have been established to meet these conditions, such as the frontage rate, assessment rate, rates based on fixtures, et cetera, but all are open to criticism. The disregard of personal responsibility, which the unlimited supply for a fixed charge fosters in the consumer, makes efficient inspection the more imperative.

By co-operation with the building department, a daily or weekly list of new and altered buildings may be obtained. The checking of these lists and obtaining accurate reports thereon in detail is a vital necessity. This, however, is only the initial step and must be followed up continuously by other methods. A system of certified monthly reports from plumbers, showing additional supplies or fixtures installed by them, should be inaugurated and carefully checked to the records and the charge to the consumer adjusted accordingly. All plumbers should be licensed.

Such work should be still further supplemented by a house-to-house examination of all premises, as frequently as may be deemed expedient, with the object of obtaining first-hand information as to the present status of each supply, so that, if necessary, the charge may be corrected and the department get full compensation for the service it renders.

By no means the least important phase of the house-to-house examination is the question of leak and waste of water, which should receive particular attention at such time. Some cities are collecting thousands of dollars annually by way of fines for leaky fixtures which the consumers neglect to repair promptly. But the creation of an additional source of revenue is not the only beneficial result. New York City saved 25,000,000 gallons of water daily last summer as a result of its leak and waste campaign, thus conserving the supply and at the same time reducing pumping costs.

The pitometer is a valuable adjunct to waste detection, and frequently, through its operation, an investigation is prompted which discloses supplies for which no revenue is being obtained.

In a community where water is supplied to shipping it is usually found necessary to establish hydrants on public docks for this purpose. This, too, is a source of revenue which needs careful inspection. It is inexpedient to keep constant watch over these hydrants and useless to meter unless a record can be kept of the water taken by each boat. Probably, therefore, the most economical method of controlling such revenue is by means of permits, issued semi-annually, the charges therefor being based on a sliding scale commensurate with the capacity of boilers and the purposes for which the craft is operated. The shipping hydrants must be effectively patrolled in order that those not entitled to take water may be prevented from doing so until a permit is obtained. Where the water front is extensive, the use of a patrol boat to supplement the work of inspectors on shore has been found advantageous. The imposition of a heavy fine for taking water without authority will quickly force the shipping interests to realize that an effective watch is being kept over their movements. The co-operation of outside agencies, such as the police and the state or federal licensing authorities, is of great assistance in strengthening such control.

It would be necessary to compile card records of all boats frequenting the port and to obtain an annual affidavit from the owners of all boats under their control, giving reasons, if any, why application is not made for permits for all their craft. The inspectors should report all boats found taking water, and the clerks would enter this information on the card record. If no permit has been issued or permit has lapsed, prompt action should be taken.

In regard to the actual collection of rates the coupon form of bill will doubtless be found most satisfactory. It is desirable that all bills tendered for payment should be listed on analytical schedules of collections before being handled by the cashier. This would provide a medium of check upon the daily receipts. A further check would be obtained by listing the coupons in the preparation of control schedules.

Notices in the form of reminders should be mailed to consumers whose accounts are in arrear. If such warnings are disregarded, penalties for non-payment should be imposed. The cashier

should be required to make a daily report on collections, distinguishing between the different classes of receipts. Such daily reports should be supplemented by a monthly statement showing comparative and accumulated figures.

A description should be written covering the detailed procedure employed in water revenue collection. A compilation of this character will not only afford the individual clerk or inspector information relative to his own work, but will make it possible for him to familiarize himself with the practical working of the complete scheme. This in itself should do much to improve the efficiency of the personnel. An understanding of the whole situation will make each man more valuable in his present capacity and more satisfactorily equipped for increased responsibility.

During the two years ending December 31, 1911, New York City increased its revenue from water approximately four and a half million dollars over and above the best previous showings in the history of the department. The greater part of this increase was due to the installation of the new system of inspection, improved accounting methods, and reorganization of the entire revenue collecting bureau along the lines herein indicated.

In conclusion, efficiency in water revenue collection can be obtained most readily when the following favorable conditions exist:

- (a) When all supplies are metered and the meters are owned by the municipality.
- (b) When the meters are periodically tested and overhauled.
- (c) When pitometer and similar waste detection work is prosecuted within reasonable limits.
- (d) When a well-planned system of inspection is enforced by competent supervision and rigid discipline.
- (e) When appropriate records based on inspectors' field reports are under a proper system of control that effectually prevents dishonesty or fraud.
- (f) When charges are promptly and regularly billed.
- (g) When all forms are standardized and adequate filing facilities are provided.
- (h) When the responsibilities of the staff are clearly outlined on an organization chart and their duties definitely fixed by a written procedure established for their guidance.
- (i) When the administrative head can promote and maintain that co-operation between the functional divisions of the bureau which is so essential to a successful consummation of efficiency work.